UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/728,629	11/30/2000	Cormac Andrias Flanagan	18973-51 (P00-2598)	5460

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EXAMINER
ROCHE, TRENTON J

ART UNIT	PAPER NUMBER
2124	7

DATE MAILED: 03/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>11 August 2003</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-17</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1,3-7,10-13 and 15-17</u> is/are rejected.

7)☒ Claim(s) <u>2,8,9 and 14</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>20 March 2001</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☐ All   b)☐ Some *   c)☐ None of:

         1.☐ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>4</u>.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

1.   This office action is responsive to communications filed 11 August 2003.

2.   Claims 1-17 have been examined.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1, 3-7, 10-13 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by

U.S. Patent 5,822,588 to Sterling et al, hereafter referred to as Sterling.

Regarding claim 1:

Sterling teaches:

- a method used in a concurrent program analysis for detecting potential race conditions, such

  as data races, in a computer program ("a method for locating errors in the use of

  synchronization locks in a multi-threaded target program…" in col. 3 lines 13-15)

- receiving a source code of the computer program, the source code including an element

  annotated as either thread-local or thread-shared ("A developer must modify the source code

  of the target program with special NOTE annotations that lets Warlock II know the

  developer's intent with respect to the locks used" in col. 7 lines 34-37)

- determining if the element is annotated as thread-shared or thread-local ("proceeds to analyze the target program's code for it usage of locks..." in col. 16 lines 64-65)

- verifying the validity of the thread-local annotation if the element is annotated as thread-local, wherein an invalid thread-local annotation may cause a race condition ("Running the analysis with such assertions in place will show the user where the assertions are violated..." in col. 17 lines 21-22. Further, as it is checking all asserted annotations, thread-local annotations would be checked.)

substantially as claimed.

Regarding claim 3:

The rejection of claim 1 is incorporated, and further, Sterling discloses verifying that the element does not include a portion annotated as thread-local, and indicating a race condition warning or error as claimed ("if other locks are already held, record the orderings in the adjacency matrix and check to make sure the order does not violate those specified in annotations..." in col. 19 lines 59-62. Further, "When warlock encounters inconsistent side effects like this, it warns the user..." in col. 22 lines 7-8)

Regarding claim 4:

The rejection of claim 1 is incorporated, and further, note the rejection regarding claim 3.

Regarding claim 5:

The rejection of claim 3 is incorporated, and further, Sterling discloses an element being a class

structure, an object, a data structure or a record as claimed ("If the variable was designated read-

only..." in col. 20 line 3)

Regarding claim 6:

The rejection of claim 1 is incorporated, and further, note the rejection regarding claim 3.

Regarding claim 7:

The rejection of claim 1 is incorporated, and further, note the rejection regarding claim 3.

Regarding claim 10:

The rejection of claim 1 is incorporated, and further, Sterling discloses checking whether a sub-

element is annotated as thread-shared or thread-local as claimed ("for each pointer maintain: a list of

functions which can be reached by a call through the function pointer. Adjacency matrix for lock

ordering..." in col. 17 lines 61-64. Further, the adjacency matrix indicates sub-elements and their

respective lock annotations.)

Regarding claim 11:

The rejection of claim 10 is incorporated, and further, Sterling discloses a race condition warning or

error indication as claimed ("When warlock encounters inconsistent side effects like this, it warns

the user..." in col. 22 lines 7-8)

Regarding claim 12:

Sterling teaches:

- an apparatus for concurrent program analysis ("an analyzer system for location errors in the use of synchronization locks in a multi-threaded target program..." in col. 42 lines 5-6)

- means for receiving source code of a computer program, the source code including an element annotated as either thread-local or thread-shared ("A developer must modify the source code of the target program with special NOTE annotations that lets Warlock II know the developer's intent with respect to the locks used" in col. 7 lines 34-37)

- means for type checking the source code ("This annotated source code is processed by a modified ANSI C compiler..." in col. 8 lines 12-13)

- means for checking annotations located either inside or in series with the type checking means ("proceeds to analyze the target program's code for it usage of locks..." in col. 16 lines 64-65)

- means for determining whether the element is annotated as thread-shared or thread-local ("proceeds to analyze the target program's code for it usage of locks..." in col. 16 lines 64-65)

- means for verifying the validity of the thread-local annotation if the element is annotated as thread-local, wherein an invalid thread-local annotation may cause a race condition such as a data race ("Running the analysis with such assertions in place will show the user where the assertions are violated..." in col. 17 lines 21-22. Further, as it is checking all asserted annotations, thread-local annotations would be checked.)

substantially as claimed.

Regarding claim 13:

The rejection of claim 12 is incorporated, and further, Sterling discloses a means for parsing the

source code as claimed ("This annotated source code is processed by a modified ANSI C

compiler..." in col. 8 lines 12-13. Further, "This name can then be recognized in the parse tree..."

in col. 10 lines 49-50)

Regarding claim 15:

The rejection of claim 12 is incorporated, and further, note the rejection regarding claim 10.

Regarding claim 16:

The rejection of claim 15 is incorporated, and further, note the rejection regarding claim 11.

Regarding claim 17:

Sterling teaches:

- a system for concurrent program analysis having a computer readable medium embodying

  program code for detecting potential race conditions, such as data races, in a computer

  program ("a computer program product comprising a computer usable medium having

  computer readable program code mechanisms embodied therein configured to locate errors

  in the use of synchronization locks in a multi-threaded target program..." in col. 42 lines 42-

  46)

- receive a source code of the computer program, the source code including an element

  annotated as either thread-local or thread-shared ("A developer must modify the source code

  of the target program with special NOTE annotations that lets Warlock II know the

  developer's intent with respect to the locks used" in col. 7 lines 34-37)

- determining if the element is annotated as thread-shared or thread-local ("proceeds to

 analyze the target program's code for it usage of locks..." in col. 16 lines 64-65)

- verifying the validity of the thread-local annotation if the element is annotated as thread-

 local, wherein an invalid thread-local annotation may cause a race condition such as a data

 race ("Running the analysis with such assertions in place will show the user where the

 assertions are violated..." in col. 17 lines 21-22. Further, as it is checking all asserted

 annotations, thread-local annotations would be checked.)

substantially as claimed.

Allowable Subject Matter

5.   Claims 2, 8, 9 and 14 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the base claim

and any intervening claims.

Conclusion

6.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

     Any inquiry concerning this communication or earlier communications from the examiner

should be directed to Trent J Roche whose telephone number is (703)305-4627. The examiner can

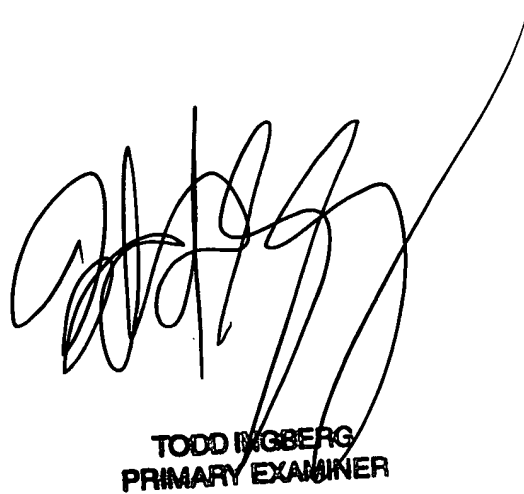normally be reached on Monday - Friday, 9:00 am - 6:30 pm.

     If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor,

Kakali Chaki can be reached on (703)305-9662. The fax phone number for the organization where

this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR system,

see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system,

contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Trent J Roche
Examiner
Art Unit 2124

TJR

TODD INGBERG
PRIMARY EXAMINER